

HEUCHERA WOODSIAPHILA (SAXIFRAGACEAE), A NEW SPECIES  
FROM THE CAPITAN MOUNTAINS OF NEW MEXICO

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ABSTRACT

A new species in the Saxifragaceae, **Heuchera woodsiaphila** is described from the Capitan Mountains of Lincoln County, New Mexico. This species is similar to those of *Heuchera* section *Holochloa* subsection *Cylindrica* but is highly disjunct from described members of the subsection. *Heuchera woodsiaphila* is readily distinguished from other *Heuchera* in the area by its greenish-white to cream apetalous flowers with erect sepals 2.75–3.75 mm long. It is known from only small, scattered populations on forested granitic talus on the north and northeastern sides of Capitan Peak, between 2,550 and 2,900 m in elevation.

RESUMEN

Se describe una especie nueva, **Heuchera woodsiaphila** (Saxifragaceae) de las Capitan Mountains en Lincoln County, Nuevo México. Esta especie es similar a las de *Heuchera* sección *Holochloa* subsección *Cylindrica*, pero geográficamente está muy alejada de miembros de la subsección descritos anteriormente. *Heuchera woodsiaphila* se distingue fácilmente de otras *Heuchera* en la región por sus flores apétalas de blanco-verdosas a ocreleucas con sépalos erectos de 2.75 a 3.75 mm de largo. Se conoce sólo de dos colectas en taludes graníticos de bosque en las laderas norte y noreste de Capitan Peak, en elevaciones de 2,550 a 2,900 m.

The Capitan Mountains are the most northeastern range in the greater Sacramento Mountains complex, a group of mountain ranges in Lincoln and Otero counties of south-central New Mexico which also includes Sierra Blanca, Carrizo Mountain, and the Sacramento Mountains proper. These mountain ranges include the highest point in the southern half of New Mexico, Sierra Blanca Peak at 3,649 m, and contain large areas over 2,500 m elevation. There are no similar mountain ranges nearby. The nearest peak exceeding 3,000 m is South Baldy in the Magdalena Mountains, ca. 190 km to the west-northwest, while the nearest peak equalling Sierra Blanca's height is Tesuque Peak in the Sangre de Cristo Mountains ca. 320 km to the north. Consequently, there is a well-developed high-elevation flora in the Sacramento Mountains complex that is isolated from other areas with similar floras. This area contains some of the most southeastern populations of typical members of the Rocky Mountain flora, such as *Picea pungens* Engelm. and *Abies bifolia* A. Murr. and is home to 21 endemic plant taxa. Most botanical exploration in the area has been conducted in the Sacramento Mountains proper and on Sierra Blanca. The Capitan Mountains and Carrizo Mountain, both granite laccoliths on the northern end of the Sacramento Mountains complex, are comparatively difficult to access and distant from centers of botanical research. Their floras remain poorly known. It is thus no coincidence that the Capitan Mountains yielded the most recently described of the endemics of the Sacramento Mts. complex, *Astragalus kerrii* Knight & Cully (Knight & Cully 1991), as well as the presently described species.

The endemic flora of the Sacramento Mountains complex has traditionally included a *Heuchera*, *H. wootonii* Rydb. of section *Parvifoliae* (Small & Rydberg 1905; Calder & Savile 1959; Rosendahl et al. 1936). This species, however, has recently been reported elsewhere and its taxonomic circumscription is uncertain (New Mexico Rare Plant Technical Council 1999; B. Shipes, personal communication). With the presently-described *H. woodsiaphila*, the Sacramento Mountains complex gains an endemic *Heuchera* at the same time that it risks losing one.



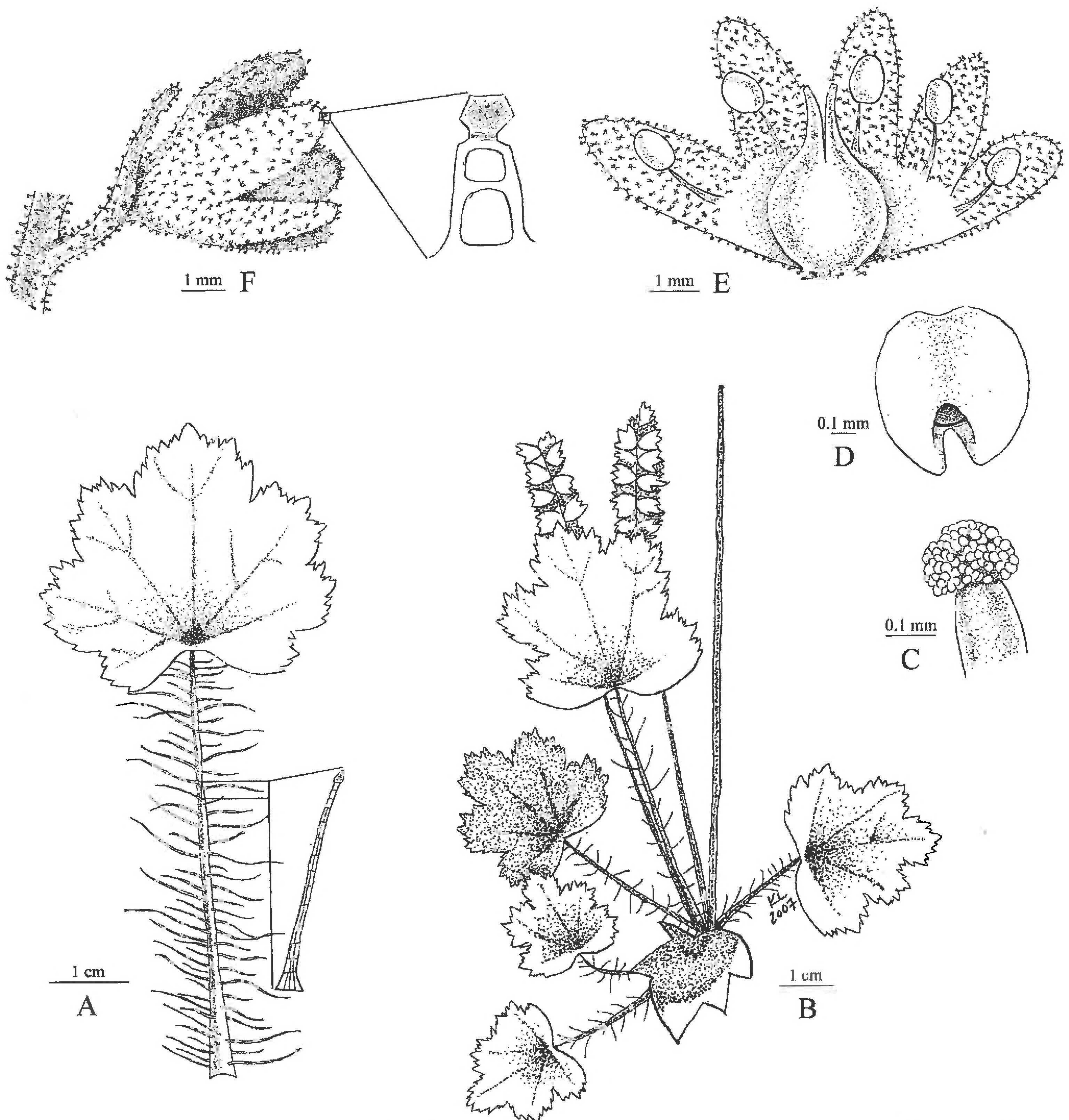


FIG. 1. *Heuchera woodsiphila*, based on P.J. Alexander 390 and S. Chaddie 135. A. Basal leaf. B. Habit. C. Stigma. D. Anther. E. Dissected flower. F. Flower, side view.

***Heuchera woodsiphila*** P.J. Alexander, sp. nov. (Figs. 1–3). TYPE: U.S.A. NEW MEXICO. Lincoln Co.: NE side of Capitan Peak on the upper part of the Capitan Peak Trail, 33° 35' 37"N 105° 15' 31.5"W, elev. 9200 ft, steep NE slope, duff soil among granite boulders in stabilized, forested talus, 17 Jul 2006, P.J. Alexander 390. (HOLOTYPE: NMC; ISOTYPES: UNM, ARIZ, ALA, MO, DUKE).

Species novum characteribus *Heuchera* sect. *Holochloa* Nutt. subsect. *Cylindricae* Rydb., maxime similis a *Heuchera saxicola* E. Nels. (Idaho, Montana, Oregon) a qua differt foliis basibus cordatis, pubescentia viscido carenti, et bracteis superis brevioribus (a 5 mm). Differt a *Heuchera* cetera in New Mexico floribus petala carentibus ac sepala erectas viridi-albas vel cremeas.

**Herbs**, perennial, acaulescent from an elongate, branching caudex; **leaves** with *stipules* lanceolate, 5–8 mm long, adnate to the petioles  $\pm 2/3$  their length, entire, glandular-puberulent, ciliate distally with whitish, gland-tipped trichomes to 2 mm long; *petioles* of the larger leaves ascending, 4–8 cm long, glandular-puberulent and sparsely villous with white, minutely gland-tipped, multicellular hairs to 5(–8) mm long; *blades* green, sub-reniform to broadly ovate, the base cordate, the larger leaves 2.5–4 cm wide and 2–3.5 cm long, shallowly 5-lobed, with  $\pm 25$ –30 broad teeth, these mucronate, the whitish mucros to 1 mm long,



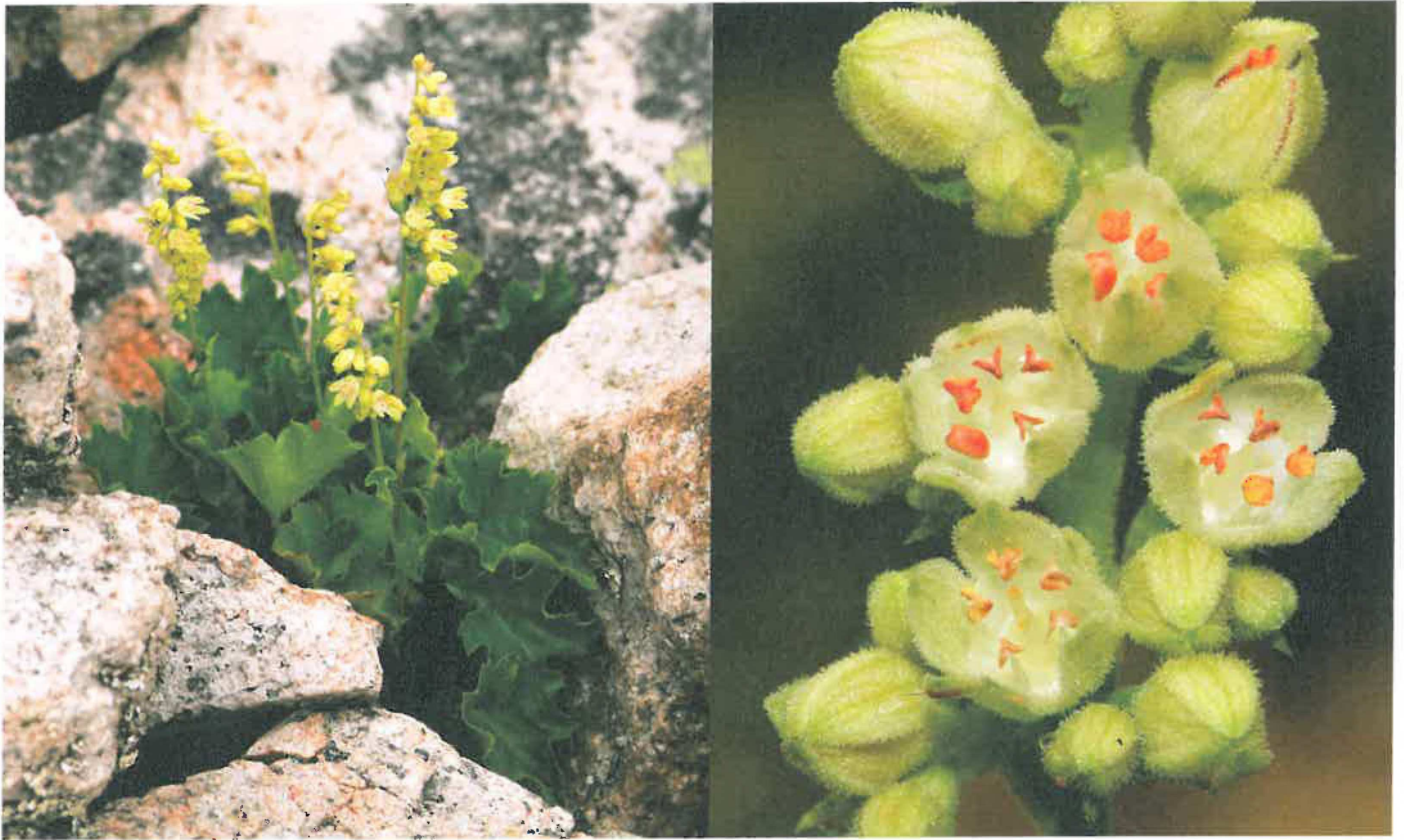


FIG. 2. Habit (left) and flowers (right) of *Heuchera woodsiaphila* photographed by myself near the type locality on Capitan Peak. Additional photographs can be found at <http://polyploid.net/Heuchera/>.

minutely gland-tipped, secondary teeth often reduced to mucros on the lateral margins of the primary teeth, margins also with minute, translucent, gland-tipped projections, surfaces glandular-pulverulent, also sparingly villous on the veins adaxially, with white, gland-tipped hairs to 2 mm long; **flowering stems** 8–20 cm high, subscapose, glandular-puberulent throughout, usually with 1–3 sterile bracts (or these absent), the sterile bracts with green blades, resembling the basal leaves, 4–15 mm long by 4–15 mm wide, 3–5 lobed, lobes of the larger bracts crenate-dentate, the teeth acuminate to short-mucronate, surfaces glandular-pulverulent; **inflorescences** 3–4 cm long, secund or subsecund, flowers born in small cymules of 1–4 flowers, peduncles mostly  $\pm$  1 mm, the lower often elongate to 7 mm, the pedicels 1–2 mm; bracts of the inflorescence variable, the lowest resembling the leaf-like sterile bracts, the rest linear, 3–5 mm long, pale green or whitish at anthesis, often becoming pinkish with age, glandular-puberulent, the stipules represented by lateral aristate teeth or absent, margins entire or distally fimbriate, bractlets of the cymules becoming progressively smaller; **flowers** apetalous, regular or nearly so, 5.25–6 mm long at anthesis, the hypanthium 1–1.5 mm long, widening gently from the inferior portion of the ovary; **sepals** 5, equal, greenish-white to cream at anthesis, the tips sometimes becoming pinkish in fruit, oblong with obtuse tips, 2.75–3.75 mm long, densely glandular-puberulent on both surfaces; **stamens** 5, arising from the hypanthium slightly below the bases of the sepals,  $\pm$  2 mm long, gently incurved, persisting until after dehiscence of the capsule, the filaments  $\pm$  1.5 mm long and the anthers  $\pm$  0.7 mm long, deeply cordate, orange, red or purplish at anthesis; **gynoecium** of 2 carpels, at anthesis with the inferior portion of the ovary hemispheric, 2–2.5 mm wide and  $\pm$  1.25 mm long, the styles and beaks of the carpels separate for  $\pm$  2 mm, the last 1–1.5 mm of this comprising the true closed styles, styles included with capitate stigmas slightly wider than the styles; **capsules** ovoid with a nearly hemispherical base, 5.5–6.5 mm long, the beaks of the carpels splitting longitudinally on their interior surfaces, the styles slightly curved outwards, equaling the sepals or exerted to 1 mm, the true closed styles 1–1.5 mm long above the beaks of the carpels; **seeds** dark brown, narrowly ellipsoid,  $\pm$  0.75 mm long by  $\pm$  0.3 mm wide, the surfaces echinulate.



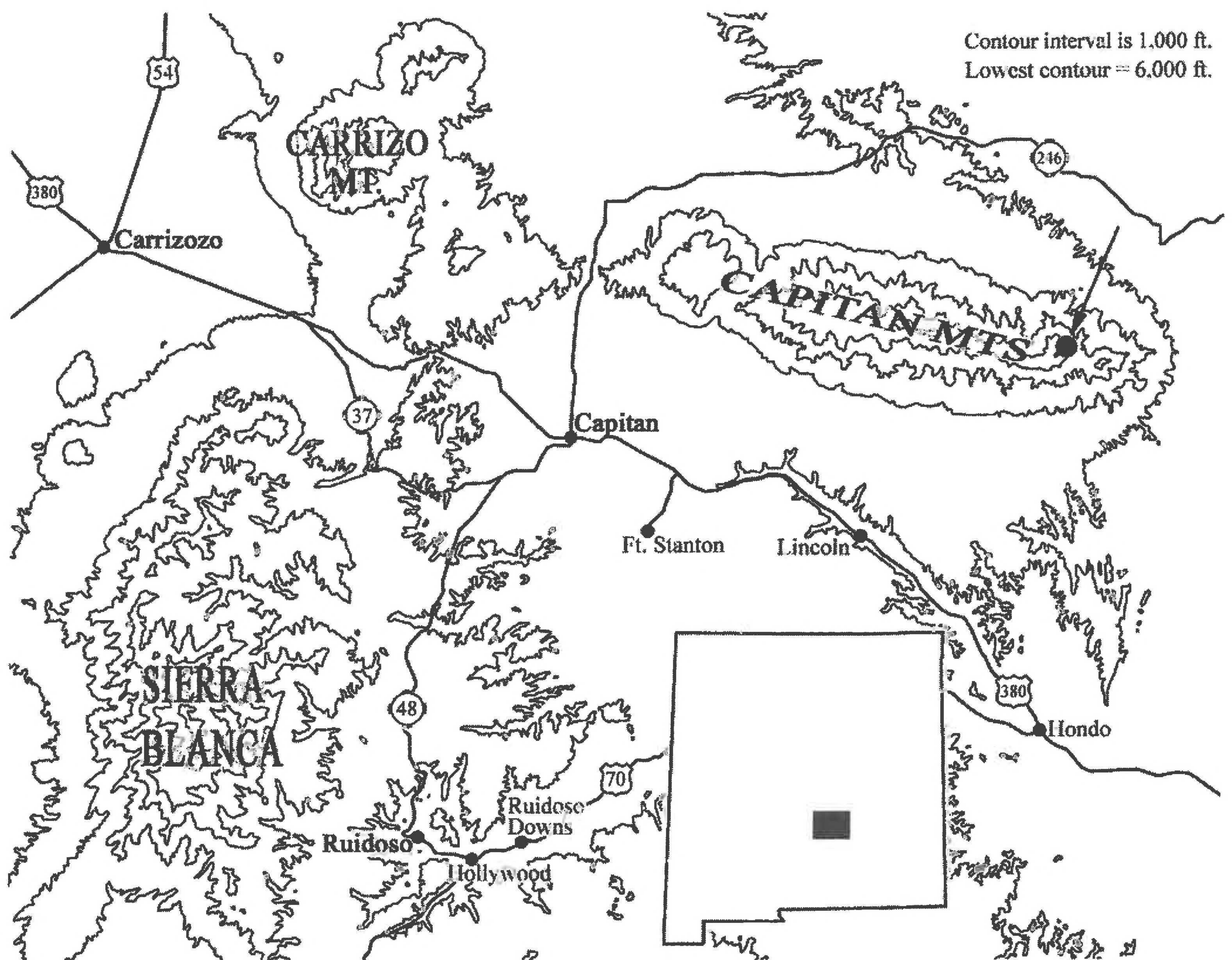


FIG. 3. Known distribution of *Heuchera woodsiaphila*. Map drawn based on the USGS 1:250,000 Roswell quadrangle topographic map.

*Etymology.*—The specific epithet refers to the close association of this species with *Woodsia plummerae* Lemmon, which is ubiquitous at populations of *H. woodsiaphila* and is often the most abundant vascular plant in the immediate vicinity.

*Phenology.*—Specimens collected in July and August include both mature fruits and flowers at anthesis.

*Geography and habitat.*—*Heuchera woodsiaphila* is presently known only from Capitan Peak at the eastern end of the Capitan Mountains in Lincoln County, New Mexico (Fig. 3), where it has been observed from 2,550 to 2,900 m in elevation along the Capitan Peak Trail, Lincoln National Forest Trail #64. It is found at locally moist sites on north or northeast, stable, forested granitic talus, usually under cover of *Pseudotsuga menziesii* (Mirb.) Franco or *Abies concolor* Lindl. & Gord. and in association with *Woodsia plummerae*. These moist sites are many, but small and scattered. Much of the forest in this area has burned recently, and *H. woodsiaphila* appears to be equally abundant in burned and unburned areas.

*Distinction from other Heuchera.* *Heuchera woodsiaphila* is very similar to members of *Heuchera* section *Holochloa* Nutt. subsection *Cylindrica* Rydb. Like other members of subsection *Cylindrica*, it has elongate (5–8 mm in the subsection), white or whitish, actinomorphic or slightly zygomorphic, apetalous flowers with campanulate hypanthia and long (2.5–6 mm in the subsection), erect sepals. *Heuchera woodsiaphila* is widely disjunct from other members of the subsection, which are present in the northwestern United States and adjacent Canada. The nearest known populations of *H. cylindrica* Dougl. are in northeastern Nevada more than 900 km to the northwest.

Taxonomy of subsection *Cylindrica* is uncertain. The subsection includes up to 9 taxa at varietal to specific ranks, all of these taxa apparently intergrading to a greater or lesser extent (Calder & Savile 1959;



Rosendahl et al. 1936). In comparatively recent floras of the northwestern United States and adjacent Canada, subsection *Cylindrica* is generally treated as two species: *H. chlorantha* Piper and a highly polymorphic *H. cylindrica* (e.g., Douglas et al. 1991; Hitchcock & Cronquist 1973). Based on the most recent monographic treatment of subsection *Cylindrica* (Calder & Savile 1959), *H. woodsiaphila* is most similar to *H. saxicola* E. Nelson and *H. cylindrica* Dougl. vars. *cylindrica* and *orbicularis* (Rosend. et al.) Calder & Savile. It differs from the former in lacking dense, viscid pubescence, in having leaves with cordate bases, and in having smaller bracts within the inflorescence. *Heuchera woodsiaphila* differs from the above-mentioned varieties of *H. cylindrica* in having shorter scapes (8–20 vs 22–70 cm) and usually having sterile bracts with well-developed blades. Although Calder and Savile (1959) do not discuss characters of the androecium or gynoecium in depth, these are described in detail by Rosendahl et al. (1936). Following the latter treatment, *H. woodsiaphila* also differs from the known members of subsection *Cylindrica* in having shorter anthers (0.7 vs. 0.9–1.5 mm) and longer true closed styles (1–1.5 vs.  $\leq 0.5$  mm). To aid in distinction of this species from others in New Mexico, a key is provided below.

KEY TO THE *HEUCHERA* SPECIES OF NEW MEXICO

1. Flowers pinkish to red.
  2. Stamens about equaling or slightly exceeding the hypanthium; petals much shorter than the sepals or absent \_\_\_\_\_ **H. sanguinea** Engelm.
  2. Stamens and petals both equaling or exceeding the sepals.
    3. Hypanthium 1 mm long or less at its shortest point; styles strongly-exserted, exceeding the sepals by at least 1 mm \_\_\_\_\_ **H. rubescens** Torr.
    3. Hypanthium 1.5 mm long or more at its shortest point; styles only slightly exserted, exceeding the sepals by less than 1 mm \_\_\_\_\_ **H. pulchella** Woot. & Standl.
1. Flowers white, cream, or greenish white.
  4. Hypanthia deep, campanulate; petals erect and shorter than to equaling the sepals, or absent; sepals whitish basally with greenish tips or whitish throughout, erect basally and spreading apically or erect throughout.
    5. Petals absent; sepals 2.5 mm or longer; scapes 8–20 cm \_\_\_\_\_ **H. woodsiaphila** P.J. Alexander
    5. Petals present; sepals 2 mm or less; scapes 25 cm or more.
      6. Sepals glandular-puberulent, the longest hairs  $\leq 0.2$  mm; true closed styles present,  $\geq 0.5$  mm long \_\_\_\_\_ **H. novomexicana** Wheelock
      6. Sepals glandular-hirsute, the longest hairs 0.3–0.6 mm long; true closed styles  $< 0.5$  mm long or apparently absent \_\_\_\_\_ **H. glomerulata** Rosend. et al.
  4. Hypanthia shallow, saucer-shaped; petals spreading, usually longer than the sepals, rarely equaling them; sepals green throughout, spreading.
    7. Petioles hirsute; plants of Lincoln, Otero, and Catron Counties. \_\_\_\_\_ **H. wootonii** Rydb.
    7. Petioles merely puberulent; plants of north-central New Mexico \_\_\_\_\_ **H. parvifolia** Nutt. ex Torr. & A. Gray

Although production of new comprehensive keys for subsection *Cylindrica* best awaits revision of the group and is thus beyond the scope of the present work, the key of Calder and Savile (1959) can be modified to accommodate *H. woodsiaphila* by replacing the first half of couplet “2” with the following:

2. Well-developed bracts of panicle 4.0–15.0 mm long and 2.5–15.0 mm wide, excluding cilia, often green and leaflike; leaf blades conspicuously viscid or not
  - 2a. Leaf blades with many viscid hairs, especially above, retaining soil and plant particles; leaf bases truncate to broadly cuneate, rarely slightly cordate \_\_\_\_\_ **H. saxicola** E. Nelson
  - 2b. Leaf blades glandular-pulverulent but not viscid, not retaining soil and plant particles; leaf bases strongly cordate \_\_\_\_\_ **H. woodsiaphila** P.J. Alexander

PARATYPE. U.S.A. NEW MEXICO: Lincoln Co.: Capitan Peak, 13 Aug 1995, S. Chaddie 135 (NMC).

*Other specimens.*—Of the other major regional herbaria only UNM and UTEP have specimens of *Heuchera* from the Sacramento Mountains complex. On viewing the collections of these herbaria no additional specimens of *H. woodsiaphila* were found.

*Discussion.*—Although a conspicuous component of the flora at Capitan Peak, *H. woodsiaphila* was still unknown when I stumbled upon it while hiking the peak in 2006. Although I quickly found S. Chaddie’s



1995 specimen (also from Capitan Peak but misidentified as *H. novomexicana*) and determined it was the same as my new collection, I could not identify these plants. Discussion with other botanists in the state, notably Robert Sivinski, quickly made it clear that this was not a species known from New Mexico but left open the possibility that it was a species well-known elsewhere. In the comprehensive monograph of *Heuchera* by Rosendahl et al. (1936), *H. woodsiaphila* clearly falls into *Heuchera* section *Holochloa* subsection *Cylindrica*. Although *H. woodsiaphila* is readily distinct from taxa of subsection *Cylindrica* as they are described in the monographic treatments of Rosendahl et al. (1936) and Calder and Savile (1959), the confused nature of this subsection makes it difficult to ascertain the limits of the considerable variation found in both the named taxa and their various hybrids. The proper status of *H. woodsiaphila* is thus difficult to determine at present. Although it could be argued that *H. woodsiaphila* is better treated as a variety of *H. cylindrica*, hiding variation within species tends in practice to obscure it or give the impression that it is unimportant. Further, this would not in any way reduce the taxonomic uncertainty in subsection *Cylindrica*, but would merely maintain the same uncertainties at a different taxonomic level. Unfortunately an adequate resolution to this problem must await a modern revision of the subsection.

Although *H. woodsiaphila* is very similar morphologically to members of subsection *Cylindrica*, the possibility that this species may result from hybridization among known New Mexican *Heuchera* and be only convergent with members of subsection *Cylindrica* should not be excluded. Leaves of *H. woodsiaphila* are identical in appearance to those of some specimens of the polymorphic *H. rubescens*, a member of section *Rhodoheuchera* R. B. & L. subsection *Rubescentes* Rydb. and, although difficult to distinguish in technical characters, seem subjectively rather different from those of subsection *Cylindrica*. Furthermore, most characteristics in which this species differs from New Mexican members of section *Holochloa*, including the long sepals, short scapes, and well-developed, leaf-like sterile bracts of the scape, can be found in *H. rubescens*. Molecular phylogenetic analyses will probably be necessary to ascertain the affiliations of *H. woodsiaphila* with any certainty.

The highly restricted distribution of *H. woodsiaphila* is also noteworthy. The apparent limitation of this species to high-elevation, forested talus may explain this limited distribution. On the Capitan Peak Trail, *H. wootonii* occurs in similar habitat to *H. woodsiaphila* but at lower elevations (1,950 to 2,400 m). On trips to the otherwise geologically and floristically similar mountains nearby, Sierra Blanca and Carrizo Mountain, I could find neither high-elevation, forested talus nor *H. woodsiaphila*. Instead, on these mountains the talus is either bare or has only low, tangled vegetation and *H. wootonii* occurs to at least 3,000 m. In these mountains, *H. wootonii* is often found near *Woodsia neomexicana* Windham or *W. phillipsii* Windham. Here *W. plummerae*, which is typically present with *H. woodsiaphila*, is conspicuously absent. Both the Capitan Mountains and nearby Carrizo Mountain are poorly explored botanically, however, and *H. woodsiaphila* may well have a broader geographic or ecological distribution than is presently known.

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